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EXAMINER

KOCH, GEORGE R

ART UNIT	PAPER NUMBER
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1734

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/712,936

Applicant(s)

LEE ET AL.

Examiner

George R. Koch III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-118 is/are pending in the application.
- 4a) Of the above claim(s) 8-10,48-51,107 and 118 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 52-83 and 86-106 is/are allowed.
- 6) ☒ Claim(s) 1-7,11, 15-19,31,39-43 and 108-117 is/are rejected.
- 7) ☒ Claim(s) 12-14,20-30,32-38,44-47 and 115-117 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on 12/21/2005 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent issuing from application 10/661,472 has been reviewed and is accepted.

The terminal disclaimer has been recorded.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. It is noted that claims 1-41 of copending application 10/661,515 are withdrawn from prosecution in that application as being drawn to a non-elected invention. Simply

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canceling those claims would also obviate the provisional nonstatutory obviousness-type double patenting rejection over that application.

4. Claims 1, 2, 6-7, 11, 15-21, 31, 39-43, 47, and 114 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-41 of copending Application No. 10/661,515 in view of Hashizume (US 2002/0062787).

Claim 1 of the '515 application is substantially identical to claim 1 of the instant application, reciting a base frame, lower chamber unit, upper chamber unit, chamber moving means, upper stage, lower stage and sealing means. Claim 1 of the '515 application does not claim first or second alignment means.

However, Hashizume, in the context of a virtually identical apparatus utilizing upper and lower chambers, chamber moving means, and upper and lower stages, discloses first alignment means for leveling the upper stage with respect to the lower stage (see paragraphs 0176-0190, load cell 129, and shafts or posts 130, and associated actuators - see Figures 19 and 20). Hashizume also discloses that these structures level the upper stage with respect to the lower stage to 50 micrometers or smaller (see paragraph 0124, which discloses that it is preferable for the substrates to be level at bonding, paragraph 0181, which discloses the level being controlled to 50 micrometers, and paragraph 0186, which discloses control of the parallel levels). Furthermore, Hashizume discloses second alignment means being used in conjunction with the first alignment means, providing support for two separate alignment means in the same LCD bonder (see Figure 17, 18, and paragraphs 0164-0175) and that the

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second alignment means control the misalignment amount (paragraph 0174).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the first and second alignment means as in Hashizume in order to ensure that the substrates are level at bonding and properly aligned, ensuring high quality bonding.

As to claim 2 of the instant invention, claim 1 of the '515 application also claims the limitations of the sealing means.

As to claims 6, 7 and 11, the '515 application is silent as to these limitations.

As to claim 6, Hashizume as incorporated discloses a first actuator (items 131 and 62), a first shaft (item 130) and a sensing means (load cell 129) as claimed (see paragraphs 0181-0182). As to claim 7, Hashizume as incorporated discloses load cells (item 129). As to claim 11, Hashizume as incorporated discloses that the first actuators (item 131) are arranged at corners of the upper chamber unit (compare Figure 19 with Figure 20. Each shaft is ends at a corner of the holder, and above it are four actuators (items 131) which inherently must be arranged in corners. One in the art would appreciate that these limitations ensure proper level bonding as motivated above.

Claims 15-17 of the instant application is essentially claimed by claims 3-5 of the '515 application.

Claim 18 of the instant application is essentially claimed by claim 7 of the '515 application.

Claim 19 of the instant application is essentially claimed by claim 8 of the '515 application.

Claim 20 of the instant application is partially claimed by claims 26-27 of the '515 application, which claims the alignment means, the plurality of cams, and plurality of restoring means, but does not claim the alignment camera. Hashizume discloses alignment means such as a camera (image pickup device 111, see Figure 17, 18, and paragraphs 0164-0175) and discloses that the devices ensure that the misalignment is within an acceptable range (paragraph 0175). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the alignment means as in Hashizume in order to ensure that the substrates are properly aligned, ensuring high quality bonding.

Claim 21 of the instant application is essentially claimed by claim 30 of the '515 application.

Claim 31 of the instant application is essentially claimed by claim 10 of the '515 application, which recites the driving motor, driving shaft, connecting part, jack part, and connecting shaft.

As to claims 39-42, the claims of the '515 application do not recite any of the claimed elements and is silent as to guiding grooves or fingers of a substrate loader.

However, Hashizume discloses a fabricating apparatus for a LCD device, comprising an upper stage including a lower surface (72a), and at least one guiding groove within the lower surface (between item 74 and the grooves in figures 12a and

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12b), wherein the figures of a substrate loader (items 44 and 45, see Figure 10) are receivable within a respective guiding groove, and a lower stage (item 72b) arranged opposite the upper stage. One in the art would appreciate that such suction force grooves and substrate loaders would ensure proper functionality and bonding of the substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the loaders and grooves in order to ensure proper placement of the substrate onto the upper stage.

As to claim 40, Hashizume as incorporated discloses a plurality of vacuum holes as claimed (see paragraphs 0125-0134) and a plurality of electrostatic chucks as claimed (Figure 13a, paragraphs 0135-0163) in the upper stage.

As to claims 41-42, Hashizume as incorporated discloses that the grooves can omit the vacuum holes or and the electrostatic chucks (see Figures 12a and 12b).

As to claim 43 and 114, Satoshi discloses a fabricating apparatus, including an upper stage. Satoshi discloses at least one passage (attraction tube 42, and see paragraphs 0018-0021) arranged within the upper stage and intersecting the lower surface of the upper stage. Satoshi is silent as to the details of the suction force transmitter or the substrate loader.

However, Hashizume discloses a fabricating apparatus for a LCD device, comprising an upper stage including a lower surface (72a), at least one passage within the upper stage and intersecting the lower surface of the upper stage (items 78a, 81a, 82a, etc, Figure 11), a suction force transmitter (pump 79a) arranged within each

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passage, the suction force transmitter having a transmission source (pump 79a) that is projectable from within the passage to a predetermined distance from the lower surface, wherein a suction force is transmittable the predetermined distance from the lower surface of the upper stage (via control of pressure strength - see paragraphs 0125 to 0134), and a substrate loader including at least one finger, wherein the upper surface of the substrate is fixable to the at least one finger (items 45 and 74, figure 10). One in the art would appreciate that such suction force controllers/transmitters and substrate loaders would ensure proper functionality and bonding of the substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the suction force controllers/transmitters and substrate loaders in order to ensure proper functionality and bonding of the substrates.

As to claim 47, Hashizume as incorporated discloses a guiding groove (formed between items 72a and 74), and that the fingers of the substrate loader (item 44 and 45) are receivable within a respective guiding groove (formed by elements 74 and 72a).

This is a provisional obviousness-type double patenting rejection.

5. Claims 3-5 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 of copending Application No. 10/661,515 and Hashizume (US 2002/0062787) as applied to claim 1 and 2 above, and further in view of Satoshi (JP2001-356,353).

The '515 application does not claim the elements of claims 3-5.

As to claim 3, Satoshi discloses that the upper and lower stages are arrangeable within the interior space (see paragraph 0037) and that the sealing means includes a central sealing member (O-ring 44), wherein the central sealing member defines the lateral boundary of the interior space. One in the art would appreciate that such movement of the stages ensures that substrates are properly aligned and that the sealing member ensures efficient atmospheric enclosures. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the movement of the stages and the positions of the sealing member in order to ensure efficient bonding.

As to claim 4 and 5, Satoshi discloses that the central sealing member includes an elastic member (such as an O-ring) and that the first seal member includes an O-ring. Satoshi discloses that the crushing of the O-ring prevents vacuum leakage (paragraph 0017). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the O-ring elastic sealing member in order to ensure that the chamber is closed without vacuum leakage.

6. Claims 114-117 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-41 of copending Application No. 10/700,475 in view of Hashizume (US 2002/0062787).

As to claim 114, Claim 1 of the '475 application claims the stage, the stage within the stage, and the suction force applying means (i.e, suction force transmitter), the suction force applying means being selectively projectable from the predetermined distance of the contact surface.

Claim 1 of the '475 application does not claim that the stage is an upper stage with a lower surface, or a substrate loader including at least one finger, wherein the upper surface of the substrate is fixable to the at least one surface.

Hashizume discloses a similar apparatus with both a stage is an upper stage with lower surface, which cooperates with a substrate loader including at least one finger, wherein the upper surface of the substrate is fixable to the at least one finger (items 45 and 74, figure 10). The substrate loader cooperates with the upper stage (since this is the stage wherein the substrate is most likely to experience the force of gravity). One in the art would appreciate that such a substrate loaders would ensure proper functionality and bonding of the substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a substrate loaders with an upper stage with a lower surface in order to ensure proper functionality and bonding of the substrates.

As to claim 115 of the instant application, claim 1 of the '475 application claims a vacuum pump generating suction force. Additionally, claim 2 claims a pad having at least one vacuum hole transmitting the suction force to an operably proximate portion of the substrate, a moving pipe (i.e., pipeline) in fluid communication with the at least one

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vacuum hole and the vacuum pump, wherein the moving pipe is movable within the passage, and a driving part moving the moving pipe within the passage.

As to claim 116 of the instant application, see claim 5 of the '475 application (also claiming that the driving part comprises an actuator and the moving pipe is an axis of the actuator.

As to claim 117 of the instant application, see claim 6 of the '475 application (also claiming that the driving part comprises an step motor and the moving pipe is an axis of the motor.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 108-112 and 114 are rejected under 35 U.S.C. 102(b) as being anticipated by Hashizume (US 2002/0062787).

As to claim 108, Hashizume discloses a fabricating apparatus for a LCD device, comprising an upper stage including a lower surface (72a), and at least one guiding groove within the lower surface (between item 74 and the grooves in figures 12a and 12b), wherein the figures of a substrate loader (items 44 and 45, see Figure 10) are receivable within a respective guiding groove, and a lower stage (item 72b) arranged opposite the upper stage.

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As to claim 109, Hashizume discloses a plurality of vacuum holes as claimed (see paragraphs 0125-0134) and a plurality of electrostatic chucks as claimed (Figure 13a, paragraphs 0135-0163) in the upper stage.

As to claim 110-111, Hashizume discloses that the grooves can omit the vacuum holes or and the electrostatic chucks (see Figures 12a and 12b).

As to claim 112, Hashizume discloses a fabricating apparatus for a LCD device, a substrate loader (Figure 10, items 44 and 45) including at least one finger, wherein an upper surface of the first substrate is fixable to the at least one finger (as shown by W2 in Figure 10), wherein the fingers of the substrate loader are receivable within a respective guiding groove (formed by elements 74 and 72a), wherein the upper surface of the first substrate is contactable to the lower surface of the upper stage (item 72a, contact is also shown in Figure 10 - and see paragraphs 0119 through 0124), and a lower stage (item 72b) opposite the upper stage.

As to claim 114, Hashizume discloses a fabricating apparatus for a LCD device, comprising an upper stage including a lower surface (72a), at least one passage within the upper stage and intersecting the lower surface of the upper stage (items 78a, 81a, 82a, etc, Figure 11), a suction force transmitter (pump 79a) arranged within each passage, the suction force transmitter having a transmission source (pump 79a) that is projectable from within the passage to a predetermined distance from the lower surface, wherein a suction force is transmittable the predetermined distance from the lower

surface of the upper stage (via control of pressure strength - see paragraphs 0125 to 0134), and a substrate loader including at least one finger, wherein the upper surface of the substrate is fixable to the at least one finger (items 45 and 74, figure 10).

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claim 113 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hashizume as applied to claim 112 above, and further in view of Lofaro (US 2001/0005669 A1).

Hashizume discloses that the finger or substrate holder holds the substrate upside down, but is silent as to the gripping technique.

However, Lofaro discloses that it is known to use vacuum technology for transporting substrates in this field of technology. In a wafer polishing tool, Lofaro discloses that wafers may be picked up and held by vacuum by vacuum fingers and then deposited by the robot into wafer carriers (paragraph 0048) efficiently and accurately. One in the art would appreciate that the vacuum suction in the fingers would implemented similarly to that as in the chucks of Hashizume, by using a vacuum pipeline and through-holes and suction force transmitters. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used

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the vacuum fingers of Lofaro in order to achieve efficient and accurate loading of the substrate.

11. Claims 1-7, 31, 39-43, 47, 108-112 and 114 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoshi (machine translation of JP 2001-356353) and Hashizume (US 2002/0062787).

Satoshi discloses a substrate bonding used in fabricating LCD devices, comprising a base frame (stand 2 and frame 3), an upper chamber unit (top chamber 21), a lower chamber unit (bottom chamber 10) mounted to the base frame, wherein the lower chamber unit is selectively connectable with the upper chamber unit (described in paragraph 0033), chamber moving means for raising and lowering the upper chamber unit (the movement is described in paragraphs 0015 and the means are items 29 and 30), an upper stage (item 28) mounted to the upper chamber unit, a lower stage (item 9) mounted to the lower chamber unit. Satoshi also discloses second alignment means for horizontally aligning the upper stage with respect to the lower stage (image recognition camera - see paragraph 0037).

Satoshi does not disclose first alignment means for leveling the upper stage with respect to the lower stage

However, Hashizume, in the context of a virtually identical apparatus utilizing upper and lower chambers, chamber moving means, and upper and lower stages, discloses first alignment means for leveling the upper stage with respect to the lower stage (see paragraphs 0176-0190, load cell 129, and shafts or posts 130, and

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associated actuators - see Figures 19 and 20). Hashizume also discloses that these structures level the upper stage with respect to the lower stage to 50 micrometers or smaller (see paragraph 0124, which discloses that it is preferable for the substrates to be level at bonding, paragraph 0181, which discloses the level being controlled to 50 micrometers, and paragraph 0186, which discloses control of the parallel levels).

Furthermore, Hashizume discloses second alignment means being used in conjunction with the first alignment means, providing support for two separate alignment means in the same LCD bonder (see Figure 17, 18, and paragraphs 0164-0175). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the first alignment means as in Hashizume in order to ensure that the substrates are level at bonding, ensuring high quality bonding.

As to claim 2, Satoshi discloses that the sealing means (O-ring 44) seals an interior space from an external environment, wherein the interior space is definable by connected ones of the upper and lower chamber units.

As to claim 3, Satoshi discloses that the upper and lower stages are arrangeable within the interior space (see paragraph 0037) and that the sealing means includes a central sealing member (O-ring 44), wherein the central sealing member defines the lateral boundary of the interior space.

As to claim 4 and 5, Satoshi discloses that the central sealing member includes an elastic member (such as an O-ring) and that the first seal member includes an O-ring.

As to claim 6, Hashizume as incorporated discloses a first actuator (items 131 and 62), a first shaft (item 130) and a sensing means (load cell 129) as claimed (see paragraphs 0181-0182).

As to claim 7, Hashizume as incorporated discloses load cells (item 129).

As to claim 11, Hashizume as incorporated discloses that the first actuators (item 131) are arranged at corners of the upper chamber unit (compare Figure 19 with Figure 20. Each shaft is ends at a corner of the holder, and above it are four actuators (items 131) which inherently must be arranged in corners.

As to claim 31, Satoshi discloses that the chamber moving means includes a driving motor fixed to the base frame (item 40), a drive shaft (item 36) coupled to the drive motor, a connecting part connected to the driving shaft (item 37), a jack part (item 30) connected to the upper chamber unit and a connecting shaft (item 29) having one end connected to the upper chamber unit and the other end connected to receive a driving force from the driving shaft.

As to claim 39 and 108, Satoshi, while disclosing fabricating apparatuses with upper and lower stages, is silent as to guiding grooves or fingers of a substrate loader.

However, Hashizume discloses a fabricating apparatus for a LCD device, comprising an upper stage including a lower surface (72a), and at least one guiding groove within the lower surface (between item 74 and the grooves in figures 12a and 12b), wherein the figures of a substrate loader (items 44 and 45, see Figure 10) are receivable within a respective guiding groove, and a lower stage (item 72b) arranged opposite the upper stage. One in the art would appreciate that such suction force

grooves and substrate loaders would ensure proper functionality and bonding of the substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the loaders and grooves in order to ensure proper placement of the substrate onto the upper stage.

As to claim 40 and 109, Hashizume as incorporated discloses a plurality of vacuum holes as claimed (see paragraphs 0125-0134) and a plurality of electrostatic chucks as claimed (Figure 13a, paragraphs 0135-0163) in the upper stage.

As to claim 41-42 and 110-111, Hashizume as incorporated discloses that the grooves can omit the vacuum holes or and the electrostatic chucks (see Figures 12a and 12b).

As to claim 43 and 114, Satoshi discloses a fabricating apparatus, including an upper stage. Satoshi discloses at least one passage (attraction tube 42, and see paragraphs 0018-0021) arranged within the upper stage and intersecting the lower surface of the upper stage. Satoshi is silent as to the details of the suction force transmitter or the substrate loader.

However, Hashizume discloses a fabricating apparatus for a LCD device, comprising an upper stage including a lower surface (72a), at least one passage within the upper stage and intersecting the lower surface of the upper stage (items 78a, 81a, 82a, etc, Figure 11), a suction force transmitter (pump 79a) arranged within each passage, the suction force transmitter having a transmission source (pump 79a) that is projectable from within the passage to a predetermined distance from the lower surface,

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wherein a suction force is transmittable the predetermined distance from the lower surface of the upper stage (via control of pressure strength - see paragraphs 0125 to 0134), and a substrate loader including at least one finger, wherein the upper surface of the substrate is fixable to the at least one finger (items 45 and 74, figure 10). One in the art would appreciate that such suction force controllers/transmitters and substrate loaders would ensure proper functionality and bonding of the substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the suction force controllers/transmitters and substrate loaders in order to ensure proper functionality and bonding of the substrates.

As to claim 47, Hashizume as incorporated discloses a guiding groove (formed between items 72a and 74), and that the fingers of the substrate loader (item 44 and 45) are receivable within a respective guiding groove (formed by elements 74 and 72a).

As to claim 112, Satoshi discloses fabricating apparatuses with upper and lower stages. Satoshi does not disclose loaders and grooves.

However, Hashizume discloses a fabricating apparatus for a LCD device, a substrate loader (Figure 10, items 44 and 45) including at least one finger, wherein an upper surface of the first substrate is fixable to the at least one finger (as shown by W2 in Figure 10), wherein the fingers of the substrate loader are receivable within a respective guiding groove (formed by elements 74 and 72a), wherein the upper surface of the first substrate is contactable to the lower surface of the upper stage (item 72a, contact is also shown in Figure 10 - and see paragraphs 0119 through 0124), and a

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lower stage (item 72b) opposite the upper stage. One in the art would appreciate that such suction force grooves and substrate loaders would ensure proper functionality and bonding of the substrates. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the loaders and grooves in order to ensure proper placement of the substrate onto the upper stage.

12. Claim 113 is rejected under 35 U.S.C. 103(a) as being unpatentable over Satoshi and Hashizume as applied to claim 112 above, and further in view of Lofaro (US 2001/0005669 A1).

Hashizume as incorporated into Satoshi discloses that the finger or substrate holder holds the substrate upside down, but is silent as to the gripping technique.

However, Lofaro discloses that it is known to use vacuum technology for transporting substrates in this field of technology. In a wafer polishing tool, Lofaro discloses that wafers may be picked up and held by vacuum by vacuum fingers and then deposited by the robot into wafer carriers (paragraph 0048) efficiently and accurately. One in the art would appreciate that the vacuum suction in the fingers would implemented similarly to that as in the chucks of Hashizume, by using a vacuum pipeline and through-holes and suction force transmitters. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used the vacuum fingers of Lofaro in order to achieve efficient and accurate loading of the substrate.

13. Claims 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoshi (the JPO database machine translation of JP 2001-356353) and Hashizume as applied to claim 1 above, and further in view of Miwa (US Patent 5,766,407)

As to claims 15 and 17, Satoshi discloses all of the limitations of claim 1, and also discloses that the upper chamber unit includes an upper side exposed to an external environment and an inner rim portion analogous to an upper chamber plate attached to the lower surface at a periphery (as in claim 15), nor discloses similar structures for the lower base and lower chamber plate (as in claim 17). However, Satoshi discloses one piece construction, and does not suggest the claimed two piece construction (i.e., upper base and upper chamber plates) for these elements.

Miwa, though, discloses that multiple component bonding chambers are known (see, for example, Figure 3). One in the art would appreciate that multiple component chambers allow for smaller replacement parts which would reduce the downtime for maintenance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used multipiece construction for chamber elements in order to enable smaller replacement parts, thus reducing maintenance downtime.

As to claim 16, Satoshi as modified by Miwa discloses that the upper chamber plate defines an upper space and that the upper stages is connected.

As to claim 18, Satoshi discloses that the lower chamber plate is movable with respect to the lower base (via elements 4a, 4b, and 4c - see paragraphs 0012-0014).

As to claim 19, Satoshi discloses that the lower chamber unit includes an lower side exposed to an external environment and an inner rim portion analogous to an lower

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chamber plate attached to the lower surface at a periphery. However, Satoshi discloses one piece construction, and does not suggest the claimed two piece construction for these elements.

Miwa, though, discloses that multiple component bonding chambers are known (see, for exaple, Figure 3). One in the art would appreciate that multiple component chambers allow for smaller replacement parts which would reduce the downtime for maintenance. Thererfore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used multipiece construction for chamber elements in order to enable smaller replacement parts, thus reducing maintenance downtime.

14. Claims 39-42, 108-112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoshi (machine translation of JP 2001-356353) and Hashizume as applied in claim 1 above, and further in view of Jin (US Patent 5,979,739).

As to claim 39, Satoshi and Hashizume discloses all of the limitations of parent claim 1. Hashizume as incorporated discloses loaders (see items 44 and 45, and 74, see Figure 10). However, Satoshi and Hashizume can be interpreted as silent as to substrate loaders with a correspondence between the loader and the upper stage (i.e., grooves), although the claim is silent as to the scope of a groove. This rejection applies if a narrow scope is argued.

Jin discloses the use of substrate loaders (item 112) and corresponding grooves (see item 111). One in the art would appreciate that grooves would facilitate quicker

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loading. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included corresponding grooves in a bonding apparatus.

As to claim 40, both Satoshi and Hashizume discloses that the upper stage includes vacuum holes and electrostatic chucks (Satoshi, paragraph 0020 and 0026; Hashizume, Figures 12a-12d).

As to claims 41 and 42, Hashizume as incorporated disclose that the grooves can omit the vacuum holes or and the electrostatic chucks (see Figures 12a and 12b).

As to claim 108, Satoshi and Hashizume discloses all of the limitations of parent claim 1, such as stages. Hashizume as incorporated discloses loaders (see items 44 and 45, and 74, see Figure 10). However, Satoshi and Hashizume is silent as to substrate loaders with a correspondence between the loader and the upper stage (i.e., grooves).

Jin discloses the use of substrate loaders (item 112) and corresponding grooves (see item 111). One in the art would appreciate that grooves would facilitate quicker loading. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included corresponding grooves in a bonding apparatus.

As to claim 109, Satoshi discloses that the upper stage includes vacuum holes and electrostatic chucks (see paragraph 0020, and 0026). Also, Hashizume as incorporated discloses a plurality of vacuum holes as claimed (see paragraphs 0125-0134) and a plurality of electrostatic chucks as claimed (Figure 13a, paragraphs 0135-0163) in the upper stage.

As to claim 110-111, Hashizume as incorporated disclose that the grooves can omit the vacuum holes or and the electrostatic chucks (see Figures 12a and 12b).

As to claim 112, see claim 108 above. Satoshi also does not disclose a substrate loader. Jin discloses a substrate loader with fingers (item 112). One in the art would appreciate that such fingers would enable better substrate gripping capability. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized such a finger in order to achieve better substrate gripping.

15. Claim 113 is rejected under 35 U.S.C. 103(a) as being unpatentable over Satoshi, Hashizume and Jin as applied to claim 112 above, and further in view of Lofaro (US 2001/0005669 A1).

Hashizume as incorporated into Satoshi discloses that the finger or substrate holder holds the substrate upside down, but is silent as to the gripping technique.

However, Lofaro discloses that it is known to use vacuum technology for transporting substrates in this field of technology. In a wafer polishing tool, Lofaro discloses that wafers may be picked up and held by vacuum by vacuum fingers and then deposited by the robot into wafer carriers (paragraph 0048) efficiently and accurately. One in the art would appreciate that the vacuum suction in the fingers would implemented similarly to that as in the chucks of Hashizume, by using a vacuum pipeline and through-holes and suction force transmitters. Therefore, it would have

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been obvious to one of ordinary skill in the art at the time of the invention to have used the vacuum fingers of Lofaro in order to achieve efficient and accurate loading of the substrate.

Allowable Subject Matter

16. Claims 44-47, 115-117 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as overcoming any obviousness type double patenting rejections.

17. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does make obvious a vacuum pump, and discloses a pipeline and through hole, but does not disclose that the suction force transmitter includes a driving part for moving the pipeline within the passage.

18. Claims 22-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as overcoming any obviousness type double patenting rejections.

19. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not suggest interval control grooves within a surface of the other of the upper and lower chamber units to which the sealing means is

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provided for receiving the sealing means in the apparatus of claim 1. Satoshi merely discloses using an O-ring sealing means without any groove.

20. Claims 32-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as overcoming any obviousness type double patenting rejections.

21. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not suggest interval control means fixed to one of the upper and lower chamber units for pushing against the other of the upper and lower chamber units on which the interval control means is fixed, and sealing means provided to a surface of one of the upper and lower chamber units in the apparatus.

22. Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as overcoming any obviousness type double patenting rejections.

23. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not suggest a receiving groove arranged within an upper surface of the lower chamber unit for receiving a respective first shaft in the apparatus of claim 1, especially in combination with the already claimed sealing means. While locking components are generically known, there is no motivation in the prior art to include such shafts and receiving grooves in the apparatus of either Satoshi or Hashizume.

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24. Claims 20-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as overcoming any obviousness type double patenting rejections.

25. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does suggest alignment cameras (both Satoshi and Hashizume disclose such structures) but does not suggest a plurality of cams and restoring means as claimed in claim 20 in the apparatus of claim 1.

26. Claims 52-83 are allowed.

27. The following is an examiner's statement of reasons for allowance: The prior art of record does disclose most of the limitations of claim 52 (see rejection of claim 1 above over Satoshi), but does not disclose or suggest interval control grooves arranged within a surface of one of the upper and lower chamber plates (for having the sealing means arranged within) in the apparatus. (Sealing means alone are disclosed in Satoshi)

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

28. Claims 86-106 are allowed.

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29. The following is an examiner's statement of reasons for allowance: The prior art of record does disclose most of the limitations of claim 86 (see rejection of claim 1 above over Satoshi), but does not disclose or suggest interval control means fixed to one of the upper and lower chamber units for pushing against the other of the upper and lower chamber units on which the interval control means is fixed, and sealing means provided to a surface of one of the upper and lower chamber units in the apparatus.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

30. Applicant's arguments with respect to claims 1-7, 15-19, 31, 39-43, and 108-116 have been considered but are moot in view of the new ground(s) of rejection.

Hazishume (US 2002/0062787) has been applied to address applicant's arguments with respect to the first and second alignment means. Hazishume is available as a reference under 35 USC 102(b), and discloses the first and second alignment means in the same context as applicant's claims and in the same context of Satoshi (i.e., LCD substrate bonding).

Hazishume also anticipates claims 108-112 and 114. Lofaro (2001/0005669) has been shown the advantages of vacuum fingers in a substrate loader).

Claim 11 was indicated as having allowable subject matter, but this subject matter is present in Hazishume.

Provisional non-statutory obviousness type double patenting rejections have been applied over applications 10/661,515 and 10/700,475. It should be noted that both of these rejections are *provisional* rejections. These rejections are simply maintained

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George R. Koch III whose telephone number is (571) 272-1230 (TDD only). If the applicant cannot make a direct TDD-to-TDD call, the applicant can communicate by calling the Federal Relay Service at 1-866-377-8642 and giving the operator the above TDD number. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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George R. Koch III
Primary Examiner
Art Unit 1734

GRK
3/4/2006